

Remarks

The Office Action dated March 26, 2007 has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1-20 are pending in this application. Claims 1-20 stand rejected.

The objection to Claim 1 because of informalities is respectfully traversed.

Claim 1 has been amended to recite "pivotably" as suggested by the Examiner.

Accordingly, Applicants respectfully request that the objection to Claim 1 be withdrawn.

The rejection of Claims 1-3, 5, 11-12, and 15 under 35 U.S.C. § 103(a) as being unpatentable over Nusbickel et al. (US 3,616,684) in view of Johnson (US 6,332,011) is respectfully traversed.

Nusbickel et al. describe an ultrasonic inspection carriage that includes a row of transducers mounted in a housing. The housing has four sides, a closed bottom, and an open top. The housing is rigidly affixed to a vertically disposed plate which is pivotally connected by parallel links to another vertically disposed plate rigidly affixed to the carriage. Notably, the housing of Nusbickel et al. can be pivoted, but the transducers do not pivot and are maintained perpendicular to the surface of the workpiece being inspected (see Col. 3, lines 34-44). The transducers are not pivotably mounted in the housing and are not pivotable within the housing.

Johnson describes a method of scanning a weld in a nuclear reactor vessel using a phased array probe positioned on top of a shroud head flange. The probe contains a linear array transducer having a plurality of elements configured to emit an ultrasonic beam. Notably, Johnson does not describe nor suggest mounting at least one ultrasonic phased array probe within a probe housing where the ultrasonic phased array probe is pivotable within the probe housing.

Also, the Office Action dated April 5, 2006 admits, at page 3, that "Johnson does not specifically disclose or suggest an ultrasonic phased array probe within a probe housing".

Independent Claim 1 recites a method of inspecting a portion of a weld between at least two materials that includes "pivotably mounting at least one ultrasonic phased array probe within a probe housing, the probe housing comprising a plurality of sides, an open top end and an open bottom end, the plurality of sides defining a housing cavity, each ultrasonic phased array probe comprising at least one transducer having a plurality of elements, the at least one ultrasonic phased array probe pivotable within the probe housing; attaching the probe housing to an outer surface of the portion of the weld so that the outer surface of the portion of the weld acts as a bottom end of the housing cavity; filling at least a portion of the housing cavity with a liquid so that the liquid is in contact with the outer surface of the portion of the weld; and scanning the weld with the at least one ultrasonic phased array probe."

Nusbickel et al. and Johnson, alone or in combination, do not describe nor suggest a method as recited in Claim 1. Particularly, Nusbickel et al. and Johnson, alone or in combination, do not describe nor suggest pivotably mounting at least one ultrasonic phased array probe within a probe housing that includes a plurality of sides, an open top end and an open bottom end, with the plurality of sides defining a housing cavity and the at least one ultrasonic phased array probe pivotable within the probe housing. Also, Nusbickel et al. and Johnson, alone or in combination, do not describe nor suggest attaching the probe housing to an outer surface of the portion of the weld so that the outer surface of the portion of the weld acts as a bottom end of the housing cavity, and filling at least a portion of the housing cavity with a liquid so that the liquid is in contact with the outer surface of the portion of the weld. Rather, Nusbickel et al. describe an ultrasonic inspection carriage that includes a row of transducers

mounted in a housing with the housing having four sides, a closed bottom, and an open top. The housing is rigidly affixed to a vertically disposed plate which is pivotally connected by parallel links to another vertically disposed plate rigidly affixed to the carriage. Notably, the housing of Nusbickel et al. can be pivoted, but the transducers do not pivot and are maintained perpendicular to the surface of the workpiece being inspected (see Col. 3, lines 34-44). The transducers are not pivotably mounted in the housing and are not pivotable within the housing. Also, because the housing of Nusbickel et al. has a closed bottom, the liquid inside the housing does not contact the outer surface of the portion of the weld that is being examined.

Further, the Office Action dated April 5, 2006 admits, at page 3, that "Johnson does not specifically disclose or suggest an ultrasonic phased array probe within a probe housing". Applicants submit that because Johnson does not describe nor suggest an ultrasonic phased array probe within a probe housing, Johnson does not describe nor suggest that the ultrasonic phased array probe is pivotable within the probe housing nor that the probe housing has an open bottom so that when the housing is mounted liquid that is added to the housing is in contact with the weld surface being examined. Therefore, combining the teachings of Johnson with the teachings of Nusbickel et al. do not describe nor suggest all the elements of Claim 1. Accordingly, Applicants submit that independent Claim 1 is patentable over Nusbickel et al. and Johnson, alone or in combination.

Claims 1-3 and 5 depend from independent Claim 1. When the recitations of dependent Claims 1-3 and 5 are considered in combination with the recitations of Claim 1, Applicants respectfully submit that Claims 1-3 and 5 likewise are patentable over Nusbickel et al. and Johnson, alone or in combination.

Independent Claim 11 of the present application recites "[a]n apparatus configured to inspect a portion of a weld between at least two materials, said apparatus comprising: a probe housing comprising a plurality of sides, an open top end and an open bottom end, the plurality of sides defining a housing cavity; and at least one ultrasonic phased array probe pivotably mounted within said probe housing, said at least one ultrasonic phased array probe pivotable within said probe housing."

Nusbickel et al. and Johnson, alone or in combination, do not describe nor suggest an apparatus as recited in Claim 11. Particularly, and at least for the reasons set forth above, Nusbickel et al. and Johnson, alone or in combination, do not describe nor suggest at least one pivotably mounted ultrasonic phased array probe within a probe housing that includes a plurality of sides, an open top end and an open bottom end, with the plurality of sides defining a housing cavity and the at least one ultrasonic phased array probe pivotable within the probe housing. Rather, Nusbickel et al. describe an ultrasonic inspection carriage that includes a row of transducers mounted in a housing with the housing having four sides, a closed bottom, and an open top. The housing is rigidly affixed to a vertically disposed plate which is pivotally connected by parallel links to another vertically disposed plate rigidly affixed to the carriage. Notably, the housing of Nusbickel et al. can be pivoted, but the transducers do not pivot and are maintained perpendicular to the surface of the workpiece being inspected (see Col. 3, lines 34-44). The transducers are not pivotably mounted in the housing and are not pivotable within the housing. Also, Johnson does not describe nor suggest any probe housing with transducers pivotable mounted therein. The Office Action dated April 5, 2006 admits, at page 3, that "Johnson does not specifically disclose or suggest an ultrasonic phased array probe within a probe housing". Therefore, combining the teachings of Johnson with the teachings of Nusbickel

et al. do not describe nor suggest all the elements of Claim 11. Accordingly, Applicants submit that independent Claim 11 is patentable over Nusbickel et al. and Johnson, alone or in combination.

Claim 12 depends from independent Claim 11. When the recitations of dependent Claim 12 are considered in combination with the recitations of Claim 11, Applicants respectfully submit that Claim 12 likewise is patentable over Nusbickel et al. and Johnson, alone or in combination.

Independent Claim 15 recites a method that includes "pivotably mounting at least one ultrasonic phased array probe within a probe housing, the probe housing comprising a plurality of sides, an open top end and an open bottom end, the plurality of sides defining a housing cavity, the at least one ultrasonic phased array probe includes at least one transducer having a plurality of elements, and the probe housing is configured to position the at least one ultrasonic phased array probe at a predetermined location on the weld, the at least one ultrasonic phased array probe pivotable within the probe housing; attaching the probe housing to an outer surface of the at least two pipes such that the portion of the weld to be inspected is positioned therein, the outer surface of the of the at least two pipes acts as a bottom end of the housing cavity; filling at least a portion of the housing cavity with a liquid so that the liquid is in contact with the outer surface of the of the at least two pipes; and scanning the portion of the weld with the at least one ultrasonic phased array probe, wherein the probe emits a steerable ultrasonic beam.

Nusbickel et al. and Johnson, alone or in combination, do not describe nor suggest a method as recited in Claim 15. Particularly, Nusbickel et al. and Johnson, alone or in combination, do not describe nor suggest pivotably mounting at least one ultrasonic phased array probe within a probe housing that includes a plurality of sides, an open top end and an open

bottom end, with the plurality of sides defining a housing cavity and the at least one ultrasonic phased array probe pivotable within the probe housing. Also, Nusbickel et al. and Johnson, alone or in combination, do not describe nor suggest attaching the probe housing to an outer surface of the portion of the weld so that the outer surface of the portion of the weld acts as a bottom end of the housing cavity, and filling at least a portion of the housing cavity with a liquid so that the liquid is in contact with the outer surface of the portion of the weld. Rather, Nusbickel et al. describe an ultrasonic inspection carriage that includes a row of transducers mounted in a housing with the housing having four sides, a closed bottom, and an open top. The housing is rigidly affixed to a vertically disposed plate which is pivotally connected by parallel links to another vertically disposed plate rigidly affixed to the carriage. Notably, the housing of Nusbickel et al. can be pivoted, but the transducers do not pivot and are maintained perpendicular to the surface of the workpiece being inspected (see Col. 3, lines 34-44). The transducers are not pivotably mounted in the housing and are not pivotable within the housing. Also, because the housing of Nusbickel et al. has a closed bottom, the liquid inside the housing does not contact the outer surface of the portion of the weld that is being examined. Also, Johnson does not describe nor suggest any probe housing with transducers pivotable mounted therein. The Office Action dated April 5, 2006 admits, at page 3, that "Johnson does not specifically disclose or suggest an ultrasonic phased array probe within a probe housing".

Therefore, combining the teachings of Johnson with the teachings of Nusbickel et al. do not describe nor suggest all the elements of Claim 15. Accordingly, Applicants submit that independent Claim 15 is patentable over Nusbickel et al. and Johnson, alone or in combination.

For the reasons set forth above, Applicants respectfully request that the Section 103(a) rejection of Claims 1-3, 5, 11-12, and 15 be withdrawn.

The rejection of Claims 4, 7-10, 13-14, 16, and 18-20 under 35 U.S.C. § 103(a) as being unpatentable over Nusbickel et al. (US 3,616,684) in view of Johnson (US 6,332,011) and further in view of Sproule (US 3,938,372) is respectfully traversed.

At least for the reasons explained above, Nusbickel et al. and Johnson, alone or in combination, do not describe nor suggest a method as recited in independent Claim 1, an apparatus as recited in independent Claim 11, or a method as recited in independent Claim 15.

Sproule describes an ultrasonic probe having a liquid filled housing and a transducer positioned in the housing. The housing has four sides and a closed bottom. The transducer is mounted on a carrying arm which moves around an arcuate plate in the housing thereby repositioning the transducer from a first location to a second location within the housing (see Figure 3). Notably, the Sproule transducer does not pivot within the housing.

Nusbickel et al., Johnson, and Sproule, alone or in combination, do not describe nor suggest a method as recited in independent Claim 1, an apparatus as recited in independent Claim 11, or a method as recited in independent Claim 15. Particularly, Nusbickel et al., Johnson, and Sproule, alone or in combination, do not describe nor suggest pivotably mounting at least one ultrasonic phased array probe within a probe housing that includes a plurality of sides, an open top end and an open bottom end, with the plurality of sides defining a housing cavity and the at least one ultrasonic phased array probe pivotable within the probe housing. Also, Nusbickel et al., Johnson, and Sproule, alone or in combination, do not describe nor suggest attaching the probe housing to an outer surface of the portion of the weld so that the outer surface of the portion of the weld acts as a bottom end of the housing cavity, and filling at least a portion of the housing cavity with a liquid so that the liquid is in contact with the outer surface of the portion of the weld. As explained above, both Nusbickel et al. and Sproule do not

describe nor suggest a probe housing with an open bottom. Therefore the liquid in the probe housing taught by Nusbickel et al. and Sproule does not contact the weld surface being examined. Also, Johnson does not describe nor suggest any probe housing with transducers pivotable mounted therein. The Office Action dated April 5, 2006 admits, at page 3, that "Johnson does not specifically disclose or suggest an ultrasonic phased array probe within a probe housing". Further, Sproule describes that the transducer is mounted on a carrying arm which moves around an arcuate plate in the housing thereby repositioning the transducer from a first location to a second location within the housing (see Figure 3). The transducer does not pivot within the housing, the transducer moves from one location in the housing to another location in the housing as shown in Figure 3. Therefore, combining the teachings of Johnson and Sproule with the teachings of Nusbickel et al. do not describe nor suggest all the elements of Claims 1, 11, and 15. Accordingly, Applicants submit that independent Claims 1, 11, and 15 are patentable over Nusbickel et al., Johnson, and Sproule, alone or in combination.

Claims 4 and 7-10 depend from independent Claim 1, Claims 13-14 depend from independent Claim 11, and Claims 16 and 18-20 depend from independent Claim 15. When the recitations of dependent Claims 1 and 7-10, dependent Claims 13-14, and dependent Claims 16 and 18-20 are considered with the recitations of Claims 1, 11, and 15 respectively, Applicants respectfully submit that Claims 4, 7-10, 13-14, 16, and 18-20 are likewise patentable over Nusbickel et al., Johnson, and Sproule, alone or in combination.

For the reasons set forth above, Applicants respectfully request that the Section 103(a) rejection of Claims 4, 7-10, 13-14, 16, and 18-20 be withdrawn.

The rejection of Claims 6 and 17 under 35 U.S.C. § 103(a) as being unpatentable over Nusbickel et al. (US 3,616,684) in view of Johnson (US 6,332,011) and further in view of Watts et al. (US 3,202,218) is respectfully traversed.

At least for the reasons explained above, Nusbickel et al. and Johnson, alone or in combination, do not describe nor suggest a method as recited in independent Claim 1, or a method as recited in independent Claim 15.

Watts et al. is cited for teaching a sealing ring positioned between two clamping rings. Watts et al. is not cited for, and does not teach, a method that includes pivotably mounting at least one ultrasonic phased array probe within a probe housing that includes a plurality of sides, an open top end and an open bottom end, with the plurality of sides defining a housing cavity and the at least one ultrasonic phased array probe pivotable within the probe housing. Also, Watts et al. do not describe nor suggest attaching the probe housing to an outer surface of the portion of the weld so that the outer surface of the portion of the weld acts as a bottom end of the housing cavity, and filling at least a portion of the housing cavity with a liquid so that the liquid is in contact with the outer surface of the portion of the weld.

Nusbickel et al., Johnson and Watts et al., alone or in combination, do not describe nor suggest a method as recited in Claim 1 or Claim 15. Particularly, Nusbickel et al., Johnson and Watts et al., alone or in combination, do not describe nor suggest pivotably mounting at least one ultrasonic phased array probe within a probe housing that includes a plurality of sides, an open top end and an open bottom end, with the plurality of sides defining a housing cavity and the at least one ultrasonic phased array probe pivotable within the probe housing. Also, Nusbickel et al., Johnson and Watts et al., alone or in combination, do not describe nor suggest attaching the probe housing to an outer surface of the portion of the weld so that the outer surface of the

portion of the weld acts as a bottom end of the housing cavity, and filling at least a portion of the housing cavity with a liquid so that the liquid is in contact with the outer surface of the portion of the weld. Accordingly, Applicants submit that independent Claims 1 and 15 are patentable over Nusbickel et al., Johnson, and Watts et al., alone or in combination.

Claim 6 depends from independent Claim 1 and Claim 17 depends from independent Claim 15. When the recitations of dependent Claims 6 and 17 are considered in combination with the recitations of Claims 1 and 15 respectively, Applicants respectfully submit that Claims 6 and 17 likewise are patentable over Nusbickel et al., Johnson, and Watts et al., alone or in combination.

For the reasons set forth above, Applicants respectfully request that the Section 103(a) rejection of Claims 6 and 17 be withdrawn.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Favorable action is respectfully solicited.

Respectfully submitted,



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